

REVIEW PLAN

MISSOURI RIVER RECOVERY MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT

KANSAS CITY AND OMAHA DISTRICTS NORTHWESTERN DIVISION



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1. PURPOSE AND REQUIREMENTS

- a. **Purpose.** This Review Plan defines the scope and level of peer review for the Missouri River Recovery Management Plan and Environmental Impact Statement (MP-EIS).

b. **References**

- (1) Engineering Circular (EC) 1165-2-214, Civil Works Review Policy, 15 Dec 2012
- (2) EC 1105-2-412, Assuring Quality of Planning Models, 31 Mar 2011
- (3) Engineering Regulation (ER) 1110-1-12, Quality Management, 30 Sep 2006
- (4) ER 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 Nov 2007
- (5) Missouri River Recovery Management Plan and Programmatic Environmental Impact Statement (MP-EIS) Project Management Plan (PMP)
- (6) Northwestern Division Quality Management System Program Management Plan, 28 Sep 2010
- (7) Kansas City District Quality Management System Program Management Plan, 03 Jan 2011

- c. **Requirements.** This review plan was developed in accordance with EC 1165-2-214, which establishes an accountable, comprehensive, life-cycle review strategy for Civil Works products by providing a seamless process for review of all Civil Works projects from initial planning through design, construction, and operation, maintenance, repair, replacement and rehabilitation (OMRR&R). The EC outlines four general levels of review: District Quality Control/Quality Assurance (DQC), Agency Technical Review (ATR), Independent External Peer Review (IEPR), and Policy and Legal Compliance Review. In addition to these levels of review, decision documents are subject to cost engineering review and certification (per EC 1165-2-214) and planning model certification/approval (per EC 1105-2-412).

2. REVIEW MANAGEMENT ORGANIZATION (RMO) COORDINATION

The RMO is responsible for managing the overall peer review effort described in this Review Plan. The RMO for decision documents is typically either a Planning Center of Expertise (PCX) or the Risk Management Center (RMC), depending on the primary purpose of the decision document. The RMO for the peer review effort described in this Review Plan is the National Ecosystem Planning Center of Expertise (ECO-PCX).

The RMO will coordinate with the Cost Engineering Directory of Expertise (DX) to ensure the appropriate expertise is included on the review teams to assess the adequacy of cost estimates, construction schedules and contingencies.

3. STUDY INFORMATION

- a. **Decision Document.** A management plan will be prepared that identifies a suite of actions that most effectively addresses Missouri River Recovery Program goals and objectives. The plan will include an environmental impact statement and establish an adaptive management process for implementing the preferred alternative.

- b. Study/Project Description.** The purpose of the Missouri River Recovery Management Plan and integrated Environmental Impact Statement is to develop a management plan that includes a suite of actions that removes or precludes jeopardy status for the piping plover, the interior least tern, and the pallid sturgeon within authorization requirements from section 601(a) of Water Resources Development Act (WRDA) of 1986, as modified by section 334(a) of WRDA 99, and further modified by section 3176 of WRDA 2007.

The MP-EIS geographic scope is the Mainstem of the Missouri River (Figure 1). Implementation of actions to meet the requirements of the Biological Opinion will occur from Fort Peck reservoir to the confluence of the Missouri and Mississippi Rivers.

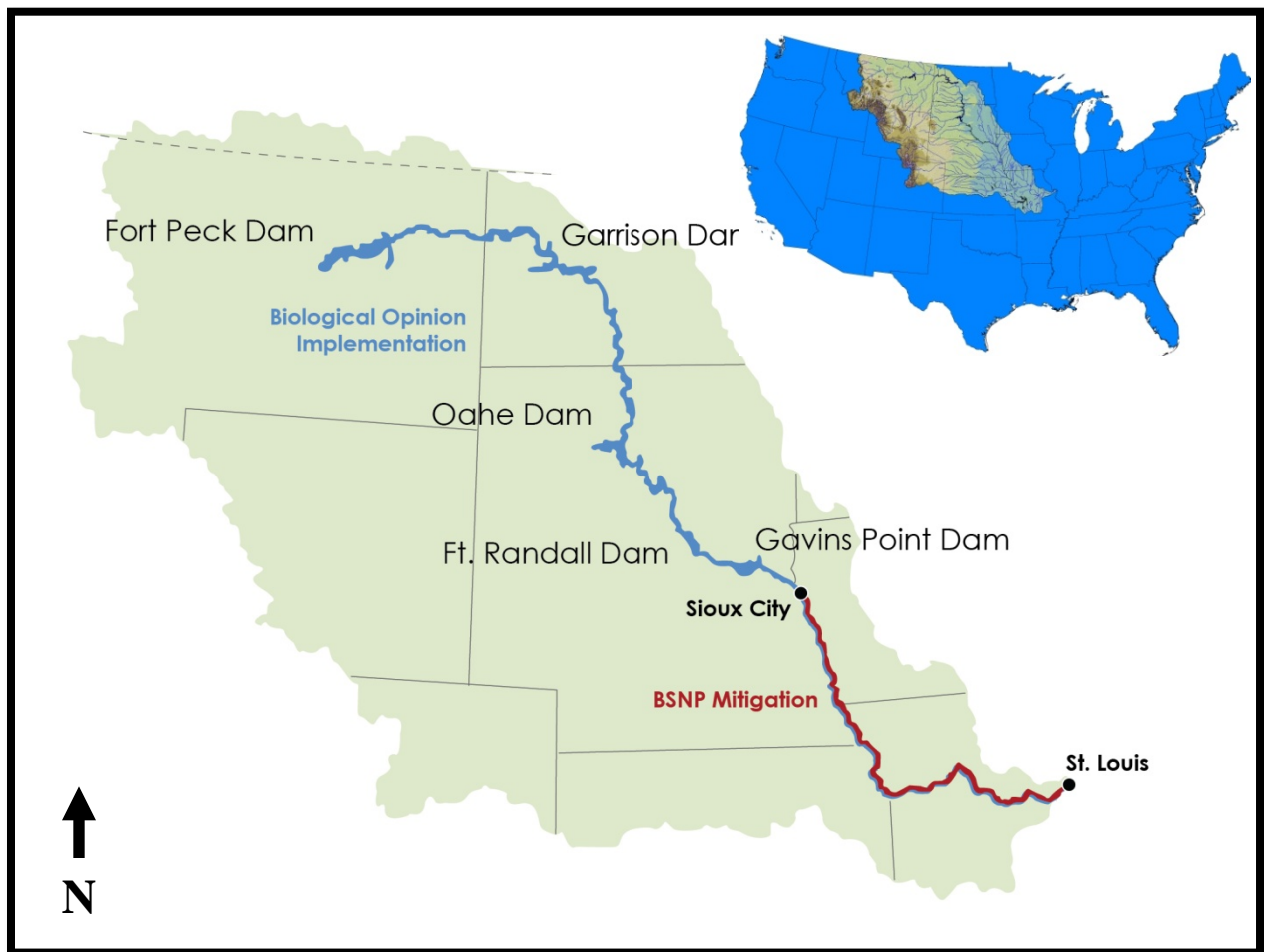


Figure 1: Management Plan geographic scope in context of the Missouri River basin.

- c. Factors Affecting the Scope and Level of Review.** This section points out significant elements of the study that will affect the review of the decision document.
- The plan will demand extensive technical and socioeconomic evaluations that may result in changes to the management of the Missouri River.

- Primary risks to the plan are likely to include conflicts among various stakeholders, and biological uncertainties associated with the three Federally-listed threatened or endangered species.
 - Any proposed management measures will be fully investigated for any potential impacts to human life, public safety, and social justice thorough H&H, geotechnical, or structural analyses, as appropriate. If, after these analyses, any plans that would increase the level of risk compared to the existing condition would not be considered for implementation.
 - To date, there has not been a request by any Governor's of any affected states for a peer review by independent experts.
 - Based on the amount of public interest for previous Missouri River planning studies, it is expected that the MP-EIS will generate considerable interest from a wide range of stakeholders.
 - The plan is likely to involve significant public dispute concerning economic and environmental impacts. This stems from the economic importance of the Missouri River to the nation due to flood control, water supply, navigation, water quality, irrigation, recreation, hydropower, and fish and wildlife benefits.
 - The evaluation of management actions will be based on H&H models, economic models, and ecological models that will be calibrated to the Missouri River when applicable. Population viability analysis models are under development for each of the three Federally-listed species. These models may require certification in accordance with EC 1105-2-412.
 - The MP-EIS will include an adaptive management strategy to manage uncertainties in physical and biological responses to specific management measures and alternatives.
- d. **In-Kind Contributions.** Because the MP-EIS is 100 percent federally funded, there will be no in-kind contributions that would require peer review.

4. DISTRICT QUALITY CONTROL (DQC)

All decision documents (including supporting data, analyses, environmental compliance documents, etc.) shall undergo DQC. DQC is an internal review process of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan (PMP). The home district shall manage DQC. Documentation of DQC activities is required and should be in accordance with the Quality Manual of the District and the home MSC.

- a. **Documentation of DQC.** The DQC team will use DrChecks™ internet based review software to comment, evaluate, and resolve all substantive issues identified during the review process.
- b. **Products to Undergo DQC.** The Draft MP-EIS, including all supporting data and analysis, will undergo DQC. Additionally, the Final MP-EIS and Record of Decision (ROD) will undergo DQC.
- c. **Required DQC Expertise.** The roster of the DQC team may vary depending on the content of the MP-EIS product. At a minimum, the disciplines identified in Table 1 will be involved in DQC. The DQC team will consist of personnel from the Omaha and Kansas City Districts. If this is not possible, personnel from other districts may be utilized. DQC team members may fill more than one of the areas of expertise identified.

Table 1: Areas of expertise for DQC team.

DQC Team Members/ Disciplines	Expertise Required
DQC Lead	The DQC lead should be a senior professional with extensive experience in preparing Civil Works decision documents and conducting DQC. The DQC lead may also serve as a reviewer for a specific discipline (such as biologist, socioeconomics, environmental resources, etc).
Biologist	The Biologist should be familiar with large river ecology. Ability to evaluate an adaptive management strategy on large scale water resource projects/programs with a focus on habitat replacement and/or endangered species recovery. Must be familiar with the application of habitat models and be able to evaluate benefits from proposed ecosystem restoration measures. Proficiency with analysis and investigation of fish and bird populations and associated lifecycle habitat requirements, preference for experience with <i>Scaphirhynchus albus</i> , <i>Sterna antillarum</i> , and <i>Charadrius melodus</i> .
Cultural Resources	Professional experience or equivalent specialized training in archaeological research, administration, or management; field and analytic experience in general North American archaeology and meets or exceeds the Federal requirements stated in "Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines," Federal Register, Vol. 48, No. 190-September 29, 1983, Pt. IV.
Planner	Team member will be an experienced large scale environmental restoration planner knowledgeable of water resource issues. Should be an expert in environmental restoration alternative development and with USACE planning policy and guidance. The planner should have a sound understanding of risk and uncertainty and be familiar with incorporating adaptive management into plan formulation.
NEPA Specialist	The environmental reviewer should have expertise in the National Environmental Policy Act, Clean Water Act, Fish and Wildlife Coordination Act, and the Endangered Species Act, and other applicable environmental laws and regulations. Working knowledge of USACE specific environmental regulations and policies including experience with planning (formulation, evaluation, and impact analysis) of large scale water resource management projects and systems of projects involving substantial focus on restoration/recovery of ecosystems and EIS documentation.
Hydrology, Hydraulic Engineering and Fluvial Geomorphology	Proficient in hydrologic and hydraulic engineering computer models, particularly ResSim and HEC-RAS; working experience with large river systems including tributary, levee and other infrastructure impacts, working knowledge and experience in water resources studies that include steady and unsteady flow analysis, water supply and flood hydrology, and natural watershed runoff; working knowledge and experience in water resources studies that include flow forecasting and scenario planning. Proficiency with analysis and investigation of river

	and associated sedimentation processes as they relate to large river geomorphology and habitat dynamics.
Adaptive Management Specialist	Professional experience or equivalent specialized training in adaptive management science and monitoring of ecosystem restoration response. Working knowledge of the other large-scale adaptive management programs. Preferentially knowledgeable and experienced in USACE planning practices.
Socioeconomics	Should be proficient in HEC-FIA, HEC-FDA and other planning models used for economic analysis; have extensive knowledge of economic principles and of the preparation and operation of economic analysis as applied to the evaluation of endangered species recovery and habitat replacement. Professional experience in land use planning; understanding of social reactions, philosophies, and impacts (monetary and non monetary) related to various species recovery and habitat replacement strategies. Knowledgeable in cost effectiveness/incremental cost analysis (CE/ICA), multi-criteria decision analysis (MCDA), and other decision analysis techniques.

5. AGENCY TECHNICAL REVIEW (ATR)

ATR is mandatory for all decision documents (including supporting data, analyses, environmental compliance documents, etc.). The objective of ATR is to ensure consistency with established criteria, guidance, procedures, and policy. The ATR will assess whether the analyses presented are technically correct and comply with published USACE guidance, and that the document explains the analyses and results in a reasonably clear manner for the public and decision makers. ATR is managed within USACE by the designated RMO and is conducted by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. ATR teams will be comprised of senior USACE personnel and may be supplemented by outside experts as appropriate. The ATR team lead will be from outside the home MSC.

- a. **Products to Undergo ATR.** The Draft MP-EIS including all supporting data and analysis will undergo ATR.
- b. **Required ATR Team Expertise.** The roster of the ATR team may vary depending on the content of the MP-EIS. At a minimum, the disciplines identified in Table 2 will be involved in ATR. ATR team members may fill more than one of the areas of expertise identified. The ATR team lead and the St. Paul District have been identified as the primary source for ATR support. Additional team members may be added from other Districts as needed.

Table 2: Areas of expertise for ATR team.

ATR Team Members/ Disciplines	Expertise Required
ATR Lead	The ATR lead should be a senior professional with extensive experience in preparing Civil Works decision documents and conducting ATR. The ATR lead may also serve as a reviewer for a specific discipline (such as biologist, socioeconomics, environmental resources, etc).
Biologist	The Biologist should be familiar with large river ecology. Must be familiar with the application of habitat models and be able to evaluate benefits from proposed ecosystem restoration measures. Proficiency with analysis and investigation of fish and bird populations and associated lifecycle habitat requirements, preference for experience with <i>Scaphirhynchus albus</i> , <i>Sterna antillarum</i> , and <i>Charadrius melodus</i> .
Cultural Resources	Professional experience or equivalent specialized training in archaeological research, administration, or management; field and analytic experience in general North American archaeology and meets or exceeds the Federal requirements stated in "Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines," Federal Register, Vol. 48, No. 190-September 29, 1983, Pt. IV.
Planner	Team member will be an experienced large scale environmental restoration planner knowledgeable of water resource issues. Should be an expert in environmental restoration alternative development and with USACE planning policy and guidance. The planner should have a sound understanding of risk and uncertainty and be familiar with incorporating adaptive management into plan formulation.
NEPA Specialist	The environmental reviewer should have expertise in the National Environmental Policy Act, Clean Water Act, Fish and Wildlife Coordination Act, and the Endangered Species Act, and other applicable environmental laws and regulations. Working knowledge of USACE specific environmental regulations and policies including experience with planning (formulation, evaluation, and impact analysis) of large scale water resource management projects and systems of projects involving substantial focus on restoration/recovery and EIS documentation.
Hydrology and Hydraulics Engineering	Proficient in hydrologic and hydraulic engineering computer models; working experience with large river systems including tributary, levee and other infrastructure impacts, working knowledge and experience in water resources studies that include steady and unsteady flow analysis, water supply and flood hydrology, and natural watershed runoff; working knowledge and experience in water resources studies that include flow forecasting and scenario planning. Proficiency with analysis and investigation of river and associated sediment dynamics as they relate to large river habitat planning and management.

Geotechnical Engineering	The geotechnical engineering reviewer should have extensive experience in geotechnical evaluation of habitat mitigation features. This includes the evaluating the impacts of these features on existing infrastructure.
Adaptive Management Specialist	Professional experience or equivalent specialized training in adaptive management science and monitoring of ecosystem restoration response. Working knowledge of other large-scale adaptive management programs for aquatic ecosystems and current and emerging policies and guidance on AM. Preferentially knowledgeable and experienced in USACE planning practices.
Socioeconomics	Should be proficient in HEC-FIA, HEC-FDA and other planning models used for economic analysis; have extensive knowledge of economic principles and of the preparation and operation of economic analysis as applied to the evaluation of endangered species recovery and habitat replacement. Professional experience in land use planning; understanding of social reactions, philosophies, and impacts (monetary and non monetary) related to various species recovery and habitat replacement strategies. Knowledgeable in cost effectiveness/incremental cost analysis (CE/ICA), multi-criteria decision analysis (MCDA), and other decision analysis techniques.

c. Documentation of ATR. DrChecks™ review software will be used to document all ATR comments, responses and associated resolutions accomplished throughout the review process. Comments should be limited to those that are required to ensure adequacy of the product. The four key parts of a quality review comment will normally include:

- (1) The review concern – identify the product’s information deficiency or incorrect application of policy, guidance, or procedures;
- (2) The basis for the concern – cite the appropriate law, policy, guidance, or procedure that has not be properly followed;
- (3) The significance of the concern – indicate the importance of the concern with regard to its potential impact on the plan selection, recommended plan components, efficiency (cost), effectiveness (function/outputs), implementation responsibilities, safety, Federal interest, or public acceptability; and
- (4) The probable specific action needed to resolve the concern – identify the action(s) that the reporting officers must take to resolve the concern.

In some situations, especially addressing incomplete or unclear information, comments may seek clarification in order to then assess whether further specific concerns may exist.

The ATR documentation in DrChecks™ will include the text of each ATR concern, the PDT response, a brief summary of the pertinent points in any discussion, including any vertical team coordination (the vertical team includes the district, RMO, MSC, and HQUSACE), and the agreed upon resolution. If an ATR concern cannot be satisfactorily resolved between the ATR team and the PDT, it will be elevated to the vertical team for further resolution in accordance with the policy issue resolution process described in either ER 1110-1-12 or ER 1105-2-100, Appendix H, as appropriate. Unresolved concerns can be closed in DrChecks™ with a notation that the concern has been elevated to the vertical team for resolution.

At the conclusion of each ATR effort, the ATR team will prepare a Review Report summarizing the review. Review Reports will be considered an integral part of the ATR documentation and shall:

- Identify the document(s) reviewed and the purpose of the review;
- Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- Include the charge to the reviewers;
- Describe the nature of their review and their findings and conclusions;
- Identify and summarize each unresolved issue (if any); and
- Include a verbatim copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

ATR may be certified when all ATR concerns are either resolved or referred to the vertical team for resolution and the ATR documentation is complete. The ATR Lead will prepare a Statement of Technical Review certifying that the issues raised by the ATR team have been resolved (or elevated to the vertical team). A sample Statement of Technical Review is included in Attachment 2.

6. INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

IEPR may be required for decision documents under certain circumstances. IEPR is the most independent level of review, and is applied in cases that meet certain criteria where the risk and magnitude of the proposed project are such that a critical examination by a qualified team outside of USACE is warranted. A risk-informed decision, as described in EC 1165-2-214, is made as to whether IEPR is appropriate. IEPR panels will consist of independent, recognized experts from outside of the USACE in the appropriate disciplines, representing a balance of areas of expertise suitable for the review being conducted. There are two types of IEPR:

- Type I IEPR. Type I IEPR reviews are managed outside the USACE and are conducted on project studies. Type I IEPR panels assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, economic analysis, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, models used in the evaluation of environmental impacts of proposed projects, and biological opinions of the project study. Type I IEPR will cover the entire decision document or action and will address all underlying engineering, economics, and environmental work, not just one aspect of the study. For decision documents where a Type II IEPR (Safety Assurance Review) is anticipated during project implementation, safety assurance shall also be addressed during the Type I IEPR per EC 1165-2-214.
- Type II IEPR. Type II IEPR, or Safety Assurance Review (SAR), are managed outside the USACE and are conducted on design and construction activities for hurricane, storm, and flood risk management projects or other projects where existing and potential hazards pose a significant threat to human life. Type II IEPR panels will conduct reviews of the design and construction activities prior to initiation of physical construction and, until construction activities are completed, periodically thereafter on a regular schedule. The reviews shall consider the adequacy, appropriateness, and acceptability of the design and construction activities in assuring public health safety and welfare.

- a. **Decision on IEPR.** In accordance with criteria established in EC 1165-2-214, Type I IEPR will be performed for the MP-EIS. Specific factors that suggest the risk and magnitude of the proposed project warrants a critical examination by a qualified team outside the USACE include:
- The management plan will be integrated with an Environmental Impact Statement.
 - Based on the amount of public interest for previous Missouri River planning studies, it is expected that the MP-EIS will also generate considerable interest as to the effects of any plan from a wide range of stakeholders.
 - The plan is likely to involve significant public dispute concerning economic and environmental impacts. This stems from the economic importance of the Missouri River to the nation from flood control, water supply, navigation, water quality, irrigation, recreation, hydropower, and fish and wildlife.
 - The MP-EIS will include an adaptive management strategy to address physical and biological uncertainties.
- b. **Products to Undergo Type I IEPR.** At a minimum, the Draft MP-EIS including all supporting data and analysis will undergo IEPR. IEPR panel members may be engaged prior to the reviewing draft document at the discretion of the Project Manager.
- a. **Required Type I IEPR Panel Expertise.** Table 3 provides examples of the types of disciplines that might be included on the IEPR panel and a sample description of the expertise required. The Outside Eligible Organization (OEO) is ultimately responsible for determining IEPR panel members.

Table 3: Areas of expertise for IEPR team.

IEPR Panel Members/ Disciplines	Expertise Required
Biologist	Expertise with analysis and investigation of: avifaunal assemblages indigenous to the Missouri River basin, preferably <i>Sterna antillarum</i> , and <i>Charadrius melodus</i> , and associated lifecycle habitat requirements as they relate to large river ecosystem; fish populations and associated lifecycle habitat requirements, preference for experience with <i>Scaphirhynchus albus</i> . Should have a minimum of a Master's of Science degree in ecology or biology and 10 years experience.
Hydrology and Hydraulics Engineering	Expertise with analysis, investigation, and simulation of river/floodplain hydraulics and hydrology, and associated sediment dynamics as they relate to large river planning and management. Expertise with analysis, investigation, and simulation of watershed/floodplain hydrology and associated water resource/supply management activities. Experience should include large river water resources planning and management including experience in water resources studies requiring flow forecasting and scenario planning. Should have a minimum of 10 years experience on large scale projects.

Planner	Team member will be an experienced large scale environmental restoration planner knowledgeable of water resource issues. Should be an expert in environmental restoration plan formulation. Should have knowledge of USACE planning policy and guidance. The planner should have a sound understanding of risk and uncertainty and be familiar with incorporating adaptive management into plan formulation. Should have at least 10 years experience on large scale projects.
NEPA Specialist	The environmental reviewer should have expertise in the National Environmental Policy Act, Clean Water Act, Fish and Wildlife Coordination Act, and the Endangered Species Act, and other applicable environmental laws and regulations. Should have at least 10 years experience preparing NEPA documents, including Environmental Impact Statements.
Socioeconomics	The Socioeconomics panel member should be have knowledge and/or experience in cost effectiveness/incremental cost analysis and multi-criteria decision analysis; have extensive knowledge of economic principles and of the preparation and operation of economic analysis and models as applied to the evaluation of habitat replacement. Should have a minimum of 10 years experience directly related to water resource economic evaluation or review.
Adaptive Management Specialist	Professional experience or equivalent specialized training in adaptive management science and monitoring of ecosystem restoration response. Working knowledge of other large-scale adaptive management programs for aquatic ecosystems and current and emerging policies and guidance on AM. Should have a minimum of a Master's of Science and 10 years relevant experience.

c. Documentation of Type I IEPR. The IEPR panel will be selected and managed by an Outside Eligible Organization (OEO) per EC 1165-2-214, Appendix D. Panel comments will be compiled by the OEO and should address the adequacy and acceptability of the economic, engineering and environmental methods, models, and analyses used. IEPR comments should generally include the same four key parts as described for ATR comments in Section 4.d above. The OEO will prepare a final Review Report that will accompany the publication of the final decision document and shall:

- Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- Include the charge to the reviewers;
- Describe the nature of their review and their findings and conclusions; and
- Include a verbatim copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

The final Review Report will be submitted by the OEO no later than 30 days following the close of the public comment period for the draft decision document. USACE shall consider all recommendations contained in the Review Report and prepare a written response for all recommendations adopted or not adopted. The final decision document will summarize the Review

Report and USACE response. The Review Report and USACE response will be made available to the public, including through electronic means on the internet.

7. POLICY AND LEGAL COMPLIANCE REVIEW

All decision documents will be reviewed throughout the study process for their compliance with law and policy. Guidance for policy and legal compliance reviews is addressed in Appendix H, ER 1105-2-100. These reviews culminate in determinations that the recommendations in the reports and the supporting analyses and coordination comply with law and policy, and warrant approval or further recommendation to higher authority by the home MSC Commander. DQC and ATR augment and complement the policy review processes by addressing compliance with pertinent published Army policies, particularly policies on analytical methods and the presentation of findings in decision documents.

8. COST ENGINEERING DIRECTORY OF EXPERTISE (DX) REVIEW AND CERTIFICATION

All decision documents shall be coordinated with the Cost Engineering DX, located in the Walla Walla District. The DX will assist in determining the expertise needed on the ATR team and Type I IEPR team (if required) and in the development of the review charge(s). The DX will also provide the Cost Engineering DX certification. The RMO is responsible for coordination with the Cost Engineering DX.

9. MODEL CERTIFICATION AND APPROVAL

EC 1105-2-412 mandates the use of certified or approved models for all planning activities to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. Planning models, for the purposes of the EC, are defined as any models and analytical tools that planners use to define water resources management problems and opportunities, to formulate potential alternatives to address the problems and take advantage of the opportunities, to evaluate potential effects of alternatives and to support decision making. The use of a certified/approved planning model does not constitute technical review of the planning product. The selection and application of the model and the input and output data is still the responsibility of the users and is subject to DQC, ATR, and IEPR (if required).

EC 1105-2-412 does not cover engineering models used in planning. The responsible use of well-known and proven USACE developed and commercial engineering software will continue and the professional practice of documenting the application of the software and modeling results will be followed. As part of the USACE Scientific and Engineering Technology (SET) Initiative, many engineering models have been identified as preferred or acceptable for use on Corps studies and these models should be used whenever appropriate. The selection and application of the model and the input and output data is still the responsibility of the users and is subject to DQC, ATR, and IEPR (if required).

a. Planning Models. Planning models that are anticipated to be used in the development of the decision document are presented in Table 4. In addition, multi-criteria decision analysis (MCDA) models may be used for sensitivity analysis of socioeconomic factors. Any sensitivity analysis utilizing these tools will be reviewed during ATR to insure the application of these tools are applied appropriately and are computationally correct. Approval of MCDA models in accordance with EC 1105-2-412 is not being sought.

b.

Table 4: Planning models that may be used for detailed economic and environmental evaluations of select plans.

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Certification / Approval Status
HEC-FIA	Analyzes the consequences from a flood event. It calculates damages to structures and contents, losses to agriculture, and estimates the potential for life loss. HEC-FIA can also assist Corps Planning studies by looking at single events deterministically to support the OSE account with Life Loss and population at risk, or through helping to determine the impacts to agriculture for typical events for the study region.	Certified
HEC-FDA Version 1.2.5	The Hydrologic Engineering Center's Flood Damage Reduction Analysis (HEC-FDA) program provides the capability for integrated hydrologic engineering and economic analysis for formulating and evaluating flood risk management plans using risk-based analysis methods.	Certified
IWR-Planning Suite	This software will be used to assist with the formulation of alternative plans by combining solutions to planning problems and calculating the additive effects of each combination, or "plan." IWR-PLAN will assist with plan comparison by conducting cost effectiveness and incremental cost analyses, identifying the plans which are the best financial investments and displaying the effects of each on a range of decision variables.	Certified
HEC-EFM	The Ecosystem Functions Model (HEC-EFM) is designed to help study teams determine ecosystem responses to changes in the flow regime of a river or connected wetland. HEC-EFM analyses involve: 1) statistical analyses of relationships between hydrology and ecology, 2) hydraulic modeling, and 3) use of Geographic Information Systems (GIS) to conduct additional analyses and/or display results and other relevant spatial data. Through this process, study teams will be able to visualize and define existing ecologic conditions, highlight promising sites for habitat development, and assess alternatives according to predicted changes in those aspects of the ecosystem relevant to the objectives. This model is also under consideration for use in socioeconomic and cultural resources impact evaluation. This may include evaluation of water supply, thermal power, wastewater discharge, irrigation, recreation, navigation, dredging, fish and wildlife, and water quality	In Review
HEC-EFM Plotter	This model is designed to help users view, navigate, and interpret output generated by HEC-EFM. Available outputs are automatically imported as a series of "Standard Plots" for the flow regimes and relationships being analyzed in HEC-EFM.	In Review
Missouri River	Developed by HDC. The Missouri River Hourly Generation	In Review

Hourly Generation Model	Model is an hourly time step model for USACE hydropower plants on the Missouri River. The model is developed in the MATLAB programming language that shapes total daily generation into hourly generating patterns. The model acts as a post-processor to a daily time step routing model like HEC-RESSIM. In addition, the model computes hourly energy prices from data exported from the Federal Energy Regulatory Commission (FERC) and the Energy Information Agency (EIA). The model is categorized as a Regional/Local Model as it was conceived to address unique situations specific characteristics for studies related to Missouri River hydropower plants.	
IMPLAN	IMPLAN is a micro-computer-based, input-output modeling system. With IMPLAN, one can estimate input-output (I-O) models of up to 528 sectors for any region consisting of one or more counties. IMPLAN includes procedures for generating multipliers and estimating impacts by applying final demand changes to the model.	Off the Shelf Software/Model
RECONS	This regional economic impact modeling tool was developed to provide accurate and defensible estimates of regional economic impacts associated with Corps spending and could be utilized to track progress and to justify continued operation, maintenance and construction work performed by the Corps. This modeling tool automates calculations and generates estimates of jobs and other economic measures such as income and sales associated with annual Civil Work program spending, as well as stemming from effects of additional economic activities (for example, water transportations, tourism spending, etc) associated with USACE's core programs. This is done by extracting multipliers and other economic measures from more than 1,400 regional economic models that were built specifically for USACE's project locations. These multipliers were then imported to a database and the tool matches various spending	Certified
Barge Costing Model (BCM)	The Barge Costing Model (BCM) is used to determine the cost of transporting commodities between specific points on a waterway system.	In Review
Navigation Investment Model (NIM)	The Navigation Investment Model (NIM) is a computerized depiction of waterway system in terms of the location of locks, fleeting points, distances between points, etc.	Certified
Adaptive Management Return on Investment (AMROI)	Under development at ERDC as part of the Ecosystem Management and Restoration Research Program. Expected completion first quarter FY14. AMROI uses probability-weighted benefit streams and associated costs with and without AM to determine if the investment in monitoring and AM is likely to yield reasonable benefits for ecosystem restoration projects. This tool can help screen AM actions and refine cost and benefit estimates used in the CE/ICA.	Will Need Certified

Interior Least Tern (<i>Sterna antillarum</i>) Population Viability Analysis Model	Currently being developed through ERDC. Expected completion is fourth quarter of FY14. This model will include interior least tern responses to habitat alteration as well as direct management interventions of the Missouri River. The model will include uncertainty, including estimation error and environmental variability, as random variables in order to provide estimates of the resulting uncertainty in model predictions and allow for statistical validation and potentially for comparison of management alternatives.	Will Need Certified
Piping Plover (<i>Charadrius melodus</i>) Population Viability Analysis Model	Currently being developed/revised through the Effects Analysis contract. An existing model developed to support current adaptive management of emergent sandbar habitat (ESH) for the MRRP will be improved in several key areas, or a second spatially explicit version of the model addressing those concerns will be developed. Expected completion is third quarter of FY14, but may not be ready for implementation until fourth quarter FY14 if the EFM model is delayed. This model will include piping plover responses to habitat alteration as well as direct management interventions of the Missouri River. The model will include uncertainty, including estimation error and environmental variability, as random variables in order to provide estimates of the resulting uncertainty in model predictions and allow for statistical validation and for comparison of management alternatives.	Will Need Certified
Pallid Sturgeon (<i>Scaphirhynchus albus</i>) Population Viability Analysis Model	Currently being developed though the Effects Analysis contract. Expected completion is fourth quarter of FY14. This will be a PVA-like model where critical life-stage transitions for pallid are related quantitatively to habitat availability and quality. Because life-stage transitions occur in different parts of the river the models are geographically distinct – spawning habitat upstream, migration/drift habitat in the middle, retention and growth downstream. The model is probability-based and thus will explicitly address uncertainty in model predictions and allow for statistical validation and comparison of management alternatives.	Will Need Certified

c. **Engineering Models.** Engineering models are anticipated to be used in the development of the decision document are shown in Table 5.

Table 5: Engineering models that may be used for detailed economic and environmental evaluations of select plans.

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Approval Status
HEC-RAS	The function of this model is to conduct one-dimensional hydraulic calculations for a full network of natural and man-made channels. HEC-RAS is a model central to the forecasting of physical conditions for alternatives under consideration,	Allowed for use

	and provides input to numerous other models used for this study. Major capabilities of HEC-RAS expected to be used for this effort include steady and unsteady hydraulic analyses, sediment transport and bed degradation/aggradation analyses, erosion/sediment deposition analyses (using SIAM), and possibly temperature modeling in select reaches. Sensitivity analyses and climate scenario analyses will be used to help define and quantify uncertainties associated with hydraulic conditions.	
RES-SIM	This model is designed to be used to model reservoir operations at one or more reservoirs whose operations are defined by a variety of operational goals and constraints. ResSim will be used to define the discharge hydrographs used for the hydraulic analyses, to assess the effects on discharge arising from climate change, and to track reservoir pool elevations.	Allowed for use
HEC-WAT	Integration software that streamlines the analytical and reporting processes of software commonly used by the multi-disciplinary teams in Corps offices for water resources studies. The WAT accomplishes this through a common graphical user interface in the PC environment. The WAT provides a framework to coordinate the study, while the individual pieces of software provide the analytical computations.	In Review

10. REVIEW SCHEDULES AND COSTS

- a. **ATR Schedule and Cost.** ATR of the Draft MP-EIS is scheduled to occur in late 2015 and early 2016 over a period of 55 working days. This allows approximately 4 weeks for the ATR team to provide comments, 5 weeks for the PDT to coordinate and provide responses, and 2 weeks for back-check and close-out of the ATR. Any changes to this schedule will be reflected in the most up to date P2 schedule maintained by the Project Manager. The cost of this ATR is not expected to exceed \$75,000. ATR of interim work products for the Draft MP-EIS may occur at the discretion of the Project Manager in coordination with the ATR team lead. Unless there are significant changes between the Draft MP-EIS and the Final MP-EIS, the final document will not undergo ATR. This determination will be at the discretion of the Project Manager.
- b. **Type I IEPR Schedule and Cost.** IEPR of the Draft MP-EIS is scheduled to occur in occur in late 2015 and early 2016 over a period of 55 working days. This allows at approximately 8 weeks from the date of the OEO Notice to Proceed to the submittal of the final Review Report by the OEO. At least 3 weeks are scheduled for the official USACE response to the IEPR recommendations. Any changes to this schedule will be reflected in the most up to date P2 schedule maintained by the Project Manager. The cost of the IEPR is estimated to be \$250,000. Additionally funding for the ECO-PCX is expected to be approximately \$10,000 for facilitation of the IEPR. It is not expected that IEPR of and interim work products or the Final MP-EIS will be needed. Final schedule and cost will be determined with the participation of an IEPR panel member and/or OEO representative once the scope of the review is further determined.

- c. **Model Certification/Approval Schedule and Cost.** Population viability analysis models are currently being developed for the interior least tern, piping plover, and pallid sturgeon. These models will be used to assist in evaluating alternatives in the MP-EIS. These models are currently being developed by or with oversight from the USACE Engineer Research and Development Center (ERDC) in Vicksburg, Mississippi. These models are expected to be completed in the 4th quarter of fiscal year 2014. The Adaptive Management Return on Investment (AMROI) may also need to be certified. This model is currently under development and is expected to be completed in the first quarter of fiscal year 14. Once they are complete, these models may undergo model certification in accordance with EC 1105-2-214 (Assuring Quality of Planning Models). It is estimated that model certification will take approximately 4-6 months and cost approximately \$150,000 per model. Additionally, funding for the ECO-PCX is expected to be approximately \$10,000 for facilitation of each model certification. All of the other planning models that may be used are either already certified or are being prepared for recommendation by the Eco-PCX for certification.

11. PUBLIC PARTICIPATION

A 70 day public scoping period occurred from August 9, 2013 through November 4, 2013. A Notice of Amendment to the Notice of Intent was published in the Federal Register on August 9, 2013 providing detailed public scoping information. Live scoping webinars were conducted on September 11, 2013 and September 18, 2013 from 3:00 p.m. to 4:30 p.m. Central Daylight Savings time. Specific efforts have been made, or are on-going, to solicit input from the Missouri River basin Tribes, the Missouri River Recovery Implementation Committee, and the various state and federal resource agencies with jurisdiction within the project area. The public will also be able to provide comments on the Draft MP-EIS during the 45 day minimum public comment period scheduled for late 2015 and early 2016. Significant and relevant public comments received on the draft MP-EIS will be considered and provided to the decision maker as part of the final MP-EIS. Also, the IEPR report and the USACE response to this report will be included in the final MP-EIS. Any changes to the date the public comment period will be reflected in the most up to date P2 schedule maintained by the Project Manager. The public has not been asked to provide nominations for external peer reviewers.

12. REVIEW PLAN APPROVAL AND UPDATES

The Northwestern District Commander is responsible for approving this Review Plan. The Commander's approval reflects vertical team input (involving district, MSC, RMO, and HQUSACE members) as to the appropriate scope and level of review for the decision document. Like the PMP, the Review Plan is a living document and may change as the study progresses. The home district is responsible for keeping the Review Plan up to date. Minor changes to the review plan since the last MSC Commander approval are documented in Attachment 3. Significant changes to the Review Plan (such as changes to the scope and/or level of review) should be re-approved by the MSC Commander following the process used for initially approving the plan. The latest version of the Review Plan, along with the Commanders' approval memorandum, should be posted on the Home District's webpage. The latest Review Plan should also be provided to the RMO and home MSC.

13. REVIEW PLAN POINTS OF CONTACT

Public questions and/or comments on this review plan can be directed to the following points of contact:

- Mr. Mark Harberg, Project Manager, Omaha District, (402) 995-2554
- Ms. Kaely Megaro, Assistant Project Manager, Kansas City District, (816) 389-2348
- Mr. Jeremy Weber, District Support Planner, Northwestern Division, (503) 808-3858
- Ms. Tomma Barnes, Eco-PCX, (910) 251-4728

ATTACHMENT 1: TEAM ROSTERS

Primary Project Delivery Team (PDT) Members				
First	Last	Discipline	Phone	Email
Mark	Harberg	Project Manager	402-995-2554	Mark.Harberg@usace.army.mil
Kaely	Megaro	Assistant Project Manager	816-389-2348	Kaely.M.Megaro@usace.army.mil
[REDACTED]	[REDACTED]	USFWS Biologist	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	USFWS Biologist	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	USFWS Biologist	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	MRRIC Program Integrator	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	MRRIC PM	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	NEPA Team Lead	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	NEPA Specialist	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	H&H Model Lead	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	Adaptive Management	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	Effects Analysis & AM Advisor	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	CEFMS/P2	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	Communication	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	Economics	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	Economics	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	Plan Formulation	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	Tribal Consultation	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	T&E Section Chief	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	Species Specialist	[REDACTED]	[REDACTED]

District Quality Control (DQC) Review Team Members				
First	Last	Discipline	Phone	Email
	TBD	DQC Team Lead		
	TBD	Biologist		
	TBD	Cultural Resources		
	TBD	Environmental Resources		
	TBD	Hydrology & Hydraulics		
	TBD	Geotechnical Engineering		
	TBD	Socioeconomics		

Agency Technical Review (ATR) Team Members				
First	Last	Discipline	Phone	Email
████	████	ATR Team Lead	████████	████████████████████
	TBD	Biologist		
	TBD	Cultural Resources		
	TBD	Environmental Resources		
	TBD	Hydrology & Hydraulics		
	TBD	Geotechnical Engineering		
	TBD	Socioeconomics		

ATTACHMENT 2: SAMPLE STATEMENT OF TECHNICAL REVIEW FOR DECISION DOCUMENTS

COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the <type of product> for <project name and location>. The ATR was conducted as defined in the project's Review Plan to comply with the requirements of EC 1165-2-214. During the ATR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing US Army Corps of Engineers policy. The ATR also assessed the District Quality Control (DQC) documentation and made the determination that the DQC activities employed appear to be appropriate and effective. All comments resulting from the ATR have been resolved and the comments have been closed in DrCheckssm.

SIGNATURE

Name

ATR Team Leader

Office Symbol/Company

Date

SIGNATURE

Name

Project Manager

Office Symbol

Date

SIGNATURE

Name

Architect Engineer Project Manager¹

Company, location

Date

SIGNATURE

Name

Review Management Office Representative

Office Symbol

Date

CERTIFICATION OF AGENCY TECHNICAL REVIEW

Significant concerns and the explanation of the resolution are as follows: Describe the major technical concerns and their resolution.

As noted above, all concerns resulting from the ATR of the project have been fully resolved.

SIGNATURE

Name

Chief, Engineering Division

Office Symbol

Date

SIGNATURE

Name

Chief, Planning Division

Office Symbol

Date

¹ Only needed if some portion of the ATR was contracted

ATTACHMENT 3: REVIEW PLAN REVISIONS

Revision Date	Description of Change	Page / Paragraph Number
11 April 2014	Removed Ruth Bentzinger and Michelle Hayes from PDT roster	18

ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS

Term	Definition	Term	Definition
AFB	Alternative Formulation Briefing	NEPA	National Environmental Policy Act
ATR	Agency Technical Review	O&M	Operation and maintenance
DQC	District Quality Control/Quality Assurance	OMRR&R	Operation, Maintenance, Repair, Replacement and Rehabilitation
DX	Directory of Expertise	OEO	Outside Eligible Organization
EC	Engineer Circular	PCX	Planning Center of Expertise
EIS	Environmental Impact Statement	PDT	Project Delivery Team
EO	Executive Order	PMP	Project Management Plan
Home District/MSD	The District or MSD responsible for the preparation of the decision document	RMC	Risk Management Center
HQUSACE	Headquarters, U.S. Army Corps of Engineers	RMO	Review Management Organization
IEPR	Independent External Peer Review	SAR	Safety Assurance Review
MP-PEIS	Management Plan and Programmatic Environmental Impact Statement	USACE	U.S. Army Corps of Engineers
MSD	Major Subordinate Command	WRDA	Water Resources Development Act